ELSEVIER

JOURNAL OF CRYSTAL GROWTH

Contents

Chairmans' preface xi
Editors' preface xiii

SECTION I. INVITED LECTURES

Epitaxial growth of lithium niobate thin films by the solid source MOCVD method
R.S. Feigelson 1
On the crystallographic and statistical mechanical foundations of the forty-year old Hartman–Perdok theory
P. Bennema 17
Morphological instabilities of lamellar eutectic growth fronts: a survey of recent experimental and numerical results
G. Faivre 29
Protein crystallization
F. Rosenberger 40

SECTION II. FUNDAMENTALS AND CHARACTERIZATION

II.1. Equilibrium interface structure

Vicinal surfaces of helium 4 crystals
E. Rolley, C. Guthmann and S. Balibar 55
Structure of $CaF_2/Si(111)$ long interface
Y. Itoh, I. Takahashi, A. Ichimiya, J. Harada and N.S. Sokolov 61
Application of polarised ultra-soft X-ray absorption near-edge spectroscopy to the characterisation of the structure of molecular interfaces
G.P. Hastie, J. Johnstone, K.J. Roberts and D. Fischer 67
RHEED study of $c(4 \times 4) \rightarrow (2 \times 4)$ transition on GaAs(001) surface
A.N. Alexeev, S.Yu. Karpov, Yu.V. Pogorelsky and I.A. Sokolov 72

II.2. Crystal habit and morphology

HABIT95 – a program for predicting the morphology of molecular crystals as a function of the growth environment
G. Clydesdale, K.J. Roberts and R. Docherty 78
Calculating the effects of surface relaxation on morphology
A.L. Rohl and D.H. Gay 84
Growth units and morphology of lithium triborate (LBO) crystals
W. Zhong and D. Tang 91
CVD growth and morphology of transition-metal phosphides
M. Fujii, H. Iwanaga and S. Motojima 99
Influence of additives on the growth morphology of γ-aminobutyric acid
C.H. Lin, N. Gabas, J.P. Canselier and N. Hiquily 104
Dissolution forms of rare-earth orthoferrites
E. Hartmann and E. Beregi 109
An inhomogeneous cell model and the growth of crystals
X.Y. Liu and P. Bennema 112
Prediction of the growth morphology of crystals
X.Y. Liu and P. Bennema 117
Collective behaviour of metastable liquid particles layer on liquid surface
K. Obara 124

II.3. Kinetics

Effects of L-glutamyl peptides on the growth of L-glutamic acid crystals (α-form)
C. Sano and N. Nagashima 129

Two-dimensional metastable macro-crystals of liquid particles on a liquid surface
K. Obara, Y. Ohtera and Y. Suemoto 136
Defect formation during crystal growth
E. Huitema and J.P. van der Eerden 141
Vacancy-type dislocation loops observed at fairly high temperatures in nearly perfect Al crystals
K. Mizuno, A. Tamiya, K. Ono, M. Iwami, E. Hashimoto and T. Kino 146
A simple method of examining the propagation of defects in the floating-zone solidification process of lithium niobate
J.-C. Chen, Y.-C. Lee and C. Hu 151
Impurity blocking of growth steps: experiments and theory
W.J.P. van Enckevort, A.C.J.F. van der Berg, K.B.G. Kreuwel, A.J. Derksen and M.S. Couto 156
KDP prismatic faces: kinetics and the mechanism of their growth from solutions
H.V. Alexandru, C. Berbecaru, A. Grancea and V. Iov 162
Thermal etching of binary and ternary III–V compounds under vacuum conditions
A.N. Alexeev, S.Yu. Karpov, M.A. Maiorov, V.E. Myachin, Yu.V. Pogorelsky and I.A. Sokolov 167
Nucleation studies of potassium hydrogen tartrate in model solutions and wines
V. Gerbaud, N. Gabas, J. Blouin and C. Laguerie 172
Crystal growth of (E)-2-butenedioic acid from aqueous solution in batch-cooling crystallization
I. Liszi and M. Hasznos-Nezdei 179
Analysis of the mechanism of diffusion limited oxygen precipitation in Cz-silicon
F. Stănculescu, M. Moldoveanu and M. Botea 183
Nucleation of single and mixed straight chain surfactants from dilute aqueous solutions
R.N.M.R. van Gelder, K.J. Roberts, J. Chambers and T. Instone 189
Growth kinetics of the metastable tetragonal phase of potassium dideuterium phosphate (DKDP) crystals
X. Yu, Y. Sun, H. Jiang and S. Zhang 195

II.4. Morphological instability

Global interfacial instabilities and selection of dendrite growth
J.-j. Xu 201
The fractal dimension of xenon dendrites
U. Bisang and J.H. Bilgram 207
Dendritic solidification of xenon
U. Bisang and J.H. Bilgram 212
In situ observation of macrostep formation on misoriented GaAs(111)B by molecular beam epitaxy
H.-W. Ren, X.-Q. Shen and T. Nishinaga 217
Planar–cellular instability at a growing nematic–isotropic interface
J.M.A. Figueiredo, A. Vidal and O.N. Mesquita 222
Formation of ''hair'' inclusions in rapidly grown potassium dihydrogen phosphate crystals
I.L. Smolsky, N.P. Zaitseva, E.B. Rudneva and S.V. Bogatyreva 228

II.5. External fields

Centrifugal techniques for solution growth of semiconductor layers
M. Konuma, I. Silier, A. Gutjahr, P.O. Hansson, G. Cristiani, E. Czech, E. Bauser and F. Banhart 234
Floating-zone growth of GaAs
A. Cröll, M. Schweizer, A. Tegetmeier and K.W. Benz 239
Characterization of CdTe:Cl crystals grown under microgravity conditions by time dependent charge measurements (TDCM)
C. Eiche, W. Joerger, M. Fiederle, D. Ebling, M. Salk, R. Schwarz and K.W. Benz 245
On the role of convection in free dendritic growth: experimental measurement of the concentration field
V. Emsellem and P. Tabeling 251
Radiation detector properties of $CdTe_{0.9}Se_{0.1}$:Cl crystals grown under microgravity in a rotating magnetic field
M. Fiederle, C. Eiche, W. Joerger, M. Salk, A.S. Senchenkov, A.V. Egorov, D.G. Ebling and K.W. Benz 256
Relationship between solution shear viscosity and density at the saturation point
A.F. Izmailov and A.S. Myerson 261
Video imaging of the melting and solidification processes of the $PbBr_2$–$PbCl_2$ system under microgravity
K. Kinoshita, S. Yoda, T. Nakamura, H. Sameshima, H. Ando, S. Anzawa and Y. Arai 266
Kinetics of microclusters in nonequilibrium plasma magnetron sputtering
K. Obara, T. Koshimae, Y. Kubo and Y. Suemoto 271

Striking effects of magnetic field on the growth morphology of electrochemical deposits
I. Mogi and M. Kamiko 276
Texturation of Bi-based 2212 superconducting bulk ceramics
S. Stassen, A. Vanderschueren, R. Cloots, A. Rulmont and M. Ausloos 281
Flow in oxide melts in a high magnetic field
Y. Miyazawa, S. Morita and H. Sekiwa 286

II.6. Characterization

Sources of optical distortion in rapidly grown crystals of KH_2PO_4
J.J. De Yoreo, Z.U. Rek, N.P. Zaitseva and B.W. Woos 291
Crystal growth of iron-based compounds by the cold-crucible Czochralski technique
Y.J. Bi, J.S. Abell and D. Fort 298
Use of optical diffraction effects in crystals for growth characterization
J. Donecker, B. Lux and P. Reiche 303
Raman scattering study and AFM morphological characterization of MOVPE-grown (111)-strained heterostructures
S. Gennari, G. Attolini, C. Pelosi, P.P. Lottici, F. Riccò, M. Labardi, M. Allegrini and C. Frediani 309
Dynamic observation of Si-island growth on a Si(111)-7 × 7 surface by high-temperature scanning tunneling microscopy
T. Hasegawa, W. Shimada, H. Tochihara and S. Hosoki 314
Contactless measurement of dopant distribution using etch roughnesses
G. Kloess, A. Cröll and K.W. Benz 319
Synchrotron X-ray topography of bismuth silicon oxide crystals
J. Martínez-López, M. González-Mañas, M.A. Caballero, E. Diéguez and B. Capelle 325
Synchrotron white beam topographic investigation of crystalline defects in silicon on insulator materials
E. Prieur, J. Härtwig, A. Garcia, M. Ohler, J. Baruchel, B. Aspar and G. Rolland 329
Transmission electron microscopy study of InGaAsP/InGaP thin-layer structure grown by liquid phase epitaxy
S. Tanaka, T. Ishikawa and M. Hibino 334

II.7. Highlights in fundamentals

Three-dimensional dendritic growth
E.A. Brener 339

SECTION III. SINGLE CRYSTALS AND CRYSTALLINE LAYERS

III.1. Large single crystals

Crystal growth and characterizations of quartz-like material: gallium phosphate ($GaPO_4$)
D. Palmier, A. Goiffon, B. Capelle, J. Détaint and E. Philippot 347
Structural non-uniformities in mercuric iodide crystals grown by two different vapour growth techniques
A. Rossberg, M. Piechotka, G. Wetzel, J. Gastaldi, A. Magerl and E. Kaldis 354
Crystal growth and characterization of $LiPbPO_4$
M. Burianek, J. Liebertz and M. Mühlberg 361
Direct observations of interface instabilities
N.B. Singh, S.S. Mani, J.D. Adam, S.R. Coriell, M.E. Glicksman, W.M.B. Duval, G.J. Santoro and R. DeWitt 364
The growth of $(Tb_xGd_{1-x})AlO_3$ single crystals by the Czochralski method
S. Morita, T. Watanabe, M. Funayama, Y. Miyazawa and M. Sekita 370
Growth and characterization of $BaLiF_3$:TM (Ni^{2+}, Co^{2+}) for laser applications
S.L. Baldochi, A.M.E. Santo, E. Martins, M. Duarte, M.M.F. Vieira, N.D. Vieira Jr. and S.P. Morato 375
Crystal growth of $PbTiO_3$ by the top-seeded solution-growth method
K. Oka, H. Unoki, H. Yamaguchi and H. Takahashi 380
Characterization of silver impurities in mercuric iodide and their relationship to γ-ray-detector performance
J.M. Van Scyoc, R.B. James, T.E. Schlesinger, T.S. Gilbert and M. Schieber 384
Crystal growth and characterization of $Fe_{2+x}Ti_{1-x}$
P. Stauche, S. Erdt-Böhm, M. Brinkmann and H. Bach 390
Laser-heated fibre pedestal growth under UHV conditions
E. Brück, H.J. Gelders, B.J. Harrison and A.A. Menovsky 394

Directional solidification of a Sn -Se eutectic alloy using the Bridgman–Stockbarger method
M.R. Aguiar and R. Caram 398
Co and Sn substituted barium M-hexaferrites: single crystal growth and magnetic characterization
R. Solé, X. Ruiz, R. Cabré, M. Aguiló, F. Díaz and V. Nikolov 402
Crystal growth and characterization of cuprous ferrite ($CuFeO_2$)
T.-r. Zhao, M. Hasegawa and H. Takei 408
Growth by the heat exchanger method and characterization of neighborite, $NaMgF_3$
A. Oçafrain, J.P. Chaminade, O. Viraphong, R. Cavagnat, M. Couzi and M. Pouchard 414
Growth and study of properties of pure and rare-earth-doped $KMgF_3$ crystals
V.K. Komar, A.V. Gektin, N.P. Ivanov, Y.A. Nesterenko and N.V. Shiran 419
Growth of $LiYF_4$ crystals doped with holmium, erbium and thulium
I.M. Ranieri, S.L. Baldochi, A.M.E. Santo, L. Gomes, L.C. Courrol, L.V.G. Tarelho, W. de Rossi, J.R. Berretta, F.E. Costa, G.E.C. Nogueira, N.U. Wetter, D.M. Zezell, N.D. Vieira, Jr. and S.P. Morato 423
Single-crystal growth and properties of CrB, Cr_3B_4, Cr_2B_3 and CrB_2 from high-temperature aluminum solutions
S. Okada, K. Kudou, K. Iizumi, K. Kudaka, I. Higashi and T. Lundström 429

III.2 Modeling

Numerical simulation of convective three-dimensional flows in a horizontal cylinder under the action of a constant magnetic field
H. Ben Hadid and D. Henry 436
Simulation of back-melting in Czochralski growth
N. Van den Bogaert and F. Dupret 446
Transient computer simulation of a CZ crystal growth process
E. Dornberger, W. von Ammon, N. Van den Bogaert and F. Dupret 452
Shape control in crystal pulling from a floating die
C.W. Lan, M.C. Liang, C.R. Song and C.K. Fu 458
InGaAs mixed crystals grown by the temperature-difference method and the numerical analysis of solution convection
T. Ozawa, M. Ando, Y. Hayakawa and M. Kumagawa 463
Dynamical behaviour of Czochralski melts and its influence on crystal growth
T. Miyano, S.-i. Inami, A. Shintani, T. Kanda and M. Hourai 469
Dynamics of melt–crystal interface and coupled convection–stress predictions for Czochralski crystal growth processes
Y.F. Zou, H. Zhang and V. Prasad 476
Unstable flow and solidification speed due to the interaction of thermocapillary and solutocapillary forces in directional solidification
D. Schwabe, X. Da and A. Scharmann 483

III.3. Optical crystals

Growth of $LiNbO_3/LiNb_{1-x}Ta_xO_3$ multilayered waveguides on $LiNbO_3$ by liquid phase epitaxy
T. Kawaguchi, M. Imaeda, M. Minakata, T. Taniuchi and T. Fukuda 489
Growth-temperature dependence of the Li/Nb ratio in LPE-grown $LiNbO_3$ films estimated by second-harmonic generation
T. Kawaguchi, M. Imaeda, R. Ohuchi, M. Minakata, T. Taniuchi and T. Fukuda 493
β-BaB_2O_4 phase-matching-direction growth by the Czochralski method
H. Kouta and Y. Kuwano 497
Growth and characterization of $KTi_{1-x}Zr_xAsO_5$ single crystals
L. Isaenko, A. Merkulov, V. Tyurikov, R. Mashkovtsev and S. Gromilov 502
Growth of organic crystalline thin films, their optical characterization and application to non-linear optics
S. Gauvin and J. Zyss 507
Solution crystal growth of urea and derivatives for nonlinear optical applications
L. Zeng, M. Zha, M. Ardoino, P. Franzosi, L. Zanotti, G. Zuccalli and C. Paorici 528
Theoretical studies for novel non-linear optical crystals
K. Wu and C. Chen 533
A high temperature study of $CsTiOAsO_4$ and $RbTiOAsO_4$
R. Bolt, M. Heim, J. Almgren and J. Åhman 537
Modified Bridgman–Stockbarger growth of a novel NLO organic crystal (2-methoxyphenyl)–methylene–propanedinitrile
M.D. Aggarwal, W.S. Wang, J. Choi, T. Myers, R.D. Clark, B.G. Penn, D.O. Frazier and M. Sanghadasa 542
Growth of a new highly efficient organic nonlinear optical crystal: 3-methoxy-4-hydroxy-benzaldehyde (MHBA)
D.R. Yuan, N. Zhang, X.T. Tao, D. Xu, M.G. Liu, W.B. Hou, Y.H. Bing and M.H. Jiang 545
Techniques for top-seeded solution growth of $BaTiO_3$
M.H. Garrett and I. Mnushkina 550

III.4. Semiconductor crystals and single crystalline films

Metalorganic vapor phase epitaxy of II–VI materials for visible light emitters
T.F. Kuech and N.R. Perkins 558
Some new design features for vertical Bridgman furnaces and the investigation of small angle grain boundaries developed during VB growth of GaAs
M. Althaus, K. Sonnenberg, E. Küssel and R. Naeven 566
A study of iron incorporation in LEC-grown indium phosphide
R. Fornari, E. Gilioli, M. Moriglioni, M. Thirumavalavan and A. Zappettini 572
The crystal perfection depends on the superheating of the mother phase too – experimental facts and speculations on the ''melt structure'' of semiconductor compounds
P. Rudolph, H.J. Koh, N. Schäfer and T. Fukuda 578
High pressure growth of GaN – new prospects for blue lasers
S. Porowski 583
Growth by OMVPE and X-ray analysis of ZnTe and ZnTe/ZnSe epilayers on III–V substrates
P. Tomasini, A. Haidoux, M. Maurin and J.C. Tedenac 590
Optical properties of doped GaN grown by a modified molecular beam epitaxial (MBE) process on GaAs substrates
T.S. Cheng, S.E. Hooper, L.C. Jenkins, C.T. Foxon, D.E. Lacklison, J.D. Dewsnip and J.W. Orton 597
Growth and characterization of GaN layers on SiC substrates
V. Dmitriev, K. Irvine, G. Bulman, J. Edmond, A. Zubrilov, V. Nikolaev, I. Nikitina, D. Tsvetkov, A. Babanin, A. Sitnikova, Yu. Musikhin and N. Bert 601
SiC liquid-phase epitaxy on patterned substrates
A.E. Nikolaev, V.A. Ivantsov, S.V. Rendakova, M.N. Blashenkov and V.A. Dmitriev 607
Growth characteristics of (100)HgCdTe layers in low-temperature MOVPE with ditertiarybutyltelluride
K. Yasuda, H. Hatano, T. Ferid, M. Minamide, T. Maejima and K. Kawamoto 612
A characteristic feature of crystalline thin-film growth of Si on a 7×7 superlattice surface of Si(111)
Y. Shigeta, J. Endo and K. Maki 617
Surface stabilization phenomena on flame-deposited diamond single crystals
J.J. Schermer, W.J.P. van Enckevort and L.J. Giling 622
Low-temperature epitaxial growth of InP by remote plasma-assisted metalorganic chemical vapour deposition
T. Sugino, M. Maeda, K. Kawarai and J. Shirafuji 628
Growth and photoluminescence properties of the filled tetrahedral semiconductor LiZnAs
K. Kuriyama, Takashi Kato, Tomoharu Kato and H. Matsuno 631
Control of oxygen in undoped liquid encapsulation Czochralski GaAs
M. Müller, G. Gärtner, G. Hirt, M. Jurisch, A. Köhler, G. Müller and B. Weinert 636
Melt–solid interface shape in LEC GaAs crystals: comparison between calculated and experimentally observed shapes
S. Carrà, S. Fogliani, M. Masi, L. Zanotti, C. Mucchino and C. Paorici 641
Growth of 2″ InP and GaAs crystals by the vertical gradient freeze (VGF) technique and characterization
J. Amon, D. Zemke, B. Hoffmann and G. Müller 646
GaSb: surface tension and floating-zone growth
A. Tegetmeier, A. Cröll, A. Danilewsky and K.W. Benz 651
Single crystal growth of $Si_{1-x}Ge_x$ by the Czochralski technique
N.V. Abrosimov, S.N. Rossolenko, V. Alex, A. Gerhardt and W. Schröder 657
Influence of melt-temperature fluctuations on striation formation in large-scale Czochralski Si growth systems
T. Kanda, M. Hourai, S. Miki, T. Shigematsu, H. Tomokage, T. Miyano, H. Morita and A. Shintani 663
Influence of crucible and crystal rotation on oxygen-concentration distribution in large-diameter silicon single crystals
I. Kanda, T. Suzuki and K. Kojima 669
Growth of Si_xGe_{1-x} crystals by the micro-pulling-down method
N. Schäfer, T. Yamada, K. Shimamura, H.J. Koh and T. Fukuda 675
In situ investigation of oxygen distribution and transport in Czochralski silicon melts by electrochemical solid ionic sensors
A. Seidl, R. Marten and G. Müller 680
Silicon crystal growth using a liquid-feeding Czochralski method
Y. Shiraishi, S. Kurosaka and M. Imai 685
The reduction of grain size in LPCVD poly-Si by in situ oxygen and phosphorus doping
S. Shishiguchi, T. Okamoto, K. Arai, K. Hasebe and N. Shigematsu 689
Solution growth of silicon on multicrystalline Si substrate: growth velocity, defect structure and electrical activity
A. Voigt, B. Steiner, W. Dorsch, J. Krinke, M. Albrecht, H.P. Strunk and G. Wagner 694

Interface shape in the vertical Bridgman configuration with and without the submerged heater
S. Meyer and A.G. Ostrogorsky 700
Identification of oxygen in the copper as the source of adhesion in Bridgman-grown $CuInSe_2$ crystals
Z.A. Shukri and C.H. Champness 708
Thermal analysis of the chemical-reaction process for $CuGa_{1-x}In_xSe_2$ crystals
H. Matsushita, H. Jitsukawa and T. Takizawa 712
Investigations of the system $LiInSe_2$–$CuInSe_2$
S. Weise, E. Nowak, A. Lenz, B. Schumann and V. Krämer 718
Bridgman-solution crystal growth and characterization of the skutterudite compounds $CoSb_3$ and $RhSb_3$
T. Caillat, J.-P. Fleurial and A. Borshchevsky 722
Solution growth of epitaxial semiconductor-on-insulator layers
I. Silier, A. Gutjahr, N. Nagel, P.O. Hansson, E. Czech, M. Konuma, E. Bauser, F. Banhart, R. Köhler, H. Raidt and B. Jenichen 727
Post-growth annealing of CdS crystals grown by physical vapor transport
K.-T. Chen, Y. Zhang, S.U. Egarievwe, M.A. George, A. Burger, C.-H. Su, Y.-G. Sha and S.L. Lehoczky 731
Mass flux and partial pressures of ZnSe by physical vapor transport
C.-H. Su, Y.-G. Sha, K. Mazuruk, S.L. Lehoczky, H.-C. Liu, R. Fang and R.F. Brebrick 736
Is $Hg_{1-x}Cd_xTe$ grown epitaxially by the travelling heater method? Does it matter?
E. Weiss, E. Benory, E. Kedar, Y. Juravel and A. Frenkel 745

III.5. Coatings and thin films

Epitaxial ferromagnetic MnSb layers on GaAs substrates grown by hot-wall epitaxy
H. Tatsuoka, H. Kuwabara, M. Oshita, T. Nakamura, H. Fujiyasu and Y. Nakanishi 754
Self-assembled monolayer coatings of iron nanoparticles with thiol derivatives
G. Katabi, Yu. Koltypin, X. Cao and A. Gedanken 760
Solid precursor MOCVD of heteroepitaxial rutile phase TiO_2
D.R. Burgess, P.A. Morris Hotsenpiller, T.J. Anderson and J.L. Hohman 763
Correlation between structural and optical properties of PbS nanocrystals
C. Ricolleau, M. Gandais, T. Gacoin and J.-P. Boilot 769
Search for high thermal expansion substrates for magneto-optic thick film garnets
V.J. Fratello, H.M. O'Bryan and C.D. Brandle 774
Heteroepitaxial growth of TiO_2 films by ion-beam sputter deposition
P.A. Morris Hotsenpiller, G.A. Wilson, A. Roshko, J.B. Rothman and G.S. Rohrer 779
X-ray diffraction evidence for the existence of epitaxial microcrystallites in thermally oxidized SiO_2 thin films on Si(111) surfaces
T. Shimura, H. Misaki, M. Umeno, I. Takahashi and J. Harada 786
Characterization of cobalt films grown on MgO(001) by dc-biased-sputter deposition
M. Hashimoto, H. Qiu, T. Ohbuchi, M. Adamik, H. Nakai, A. Barna and P.B. Barna 792
Preparation and characterization of conducting thin films of molecular organic conductors (TTF–TCNQ)
A. Figueras, S. Garelik, J. Caro, J. Cifré, J. Veciana, C. Rovira, E. Ribera, E. Canadell, A. Seffar and J. Fontcuberta 798

III.6. High T_c materials

Top-seeded solution growth of $YBa_2Cu_3O_{6+d}$ superconductive crystals
Y. Yamada, M. Nakamura, C. Krauns, M. Tagami, Y. Shiohara and S. Tanaka 804
Crystal growth mechanisms and growth anisotropy of $YBa_2Cu_3O_x$ crystals
Th. Wolf 810
Simulations of the kinetic growth of $YBa_2Cu_3O_{7-\delta}$ grains
R. Cloots, N. Vandewalle and M. Ausloos 816
Growth and microstructure in $Bi_2Sr_2CaCu_2O_y$ single crystals
G. Yang, J.S. Abell, P. Shang, I.P. Jones and C.E. Gough 820
Growth instability in $LnSrGaO_4$ (Ln: Pr,Nd) crystal pulling
M. Sasaura and S. Miyazawa 825
Raman and infrared spectroscopy and transport properties of aged organometallic precursors used for the deposition of high-T_c superconducting films
V. Burtman, M. Schieber, I. Brodsky, H. Hermon and Y. Yaroslavsky 832
Microstructure and surface morphology of a/b-axis oriented $YBa_2Cu_3O_{7-x}$ films on (110) $NdGaO_3$ grown by liquid phase epitaxy
C. Dubs, S. Bornmann, M. Schmelz, T. Schüler, F. Sandiumenge, G. Bruchlos and P. Görnert 836

Growth of homoepitaxial $YBa_2Cu_3O_{7-x}$ films by molecular beam epitaxy
T. Shimizu, H. Nonaka and K. Arai 841
Structural characterization of superconducting Y–Ba–Cu–O thin films, prepared by pulsed electron beam evaporation
S. Christiansen, F. Mücke, J. Markl, W. Dorsch, R. Stark, K. Frank, H.P. Strunk, G. Saemann-Ischenko and J. Christiansen 848
Growth mechanism and crystalline orientation of liquid-phase epitaxially grown $YBa_2Cu_3O_{7-y}$ films
T. Kitamura, Y. Yamada, Y. Shiohara, I. Hirabayashi, S. Tanaka, Y. Sugawara and Y. Ikuhara 854
Crystal growth of $SmBa_2Cu_3O_{7-x}$ under low oxygen partial pressure
M. Nakamura, C. Krauns, Y. Yamada and Y. Shiohara 859
Growth of doped and undoped BSCCO 2212 crystals in platinum crucibles by repeated remelting and recrystallisation
A.J.S. Chowdhury, B.M.R. Wanklyn, A.V. Volkozub and J.W. Hodby 863
Primary crystallization field and crystal growth of $Bi_2Sr_2CaCu_2O_x$
Y. Huang, M.-H. Huang and J.M. Jian 867
In situ observation of phase changes by X-ray diffraction in the Bi–Sr–Ca–Cu–O system
T. Suzuki, K.-I. Yumoto, M. Hasegawa and H. Takei 872
Nickel containing perovskites
V.J. Fratello, G.W. Berkstresser, C.D. Brandle and A.J. Ven Graitis 878

SECTION IV. SPECIAL AND COMPLEX MATERIALS

IV.1. Specialities

Growth, perfection, and mechanical properties of C_{60} single crystals
M. Tachibana, M. Michiyama, H. Sakuma, K. Kikuchi, Y. Achiba and K. Kojima 883
Regrowth of carbon nanotubes and nanoparticles
Y. Ando, M. Ohkohchi and M. Wang 888

IV.2. Organic crystals

Mechanisms of protein and virus crystal growth: an atomic force microscopy study of canavalin and STMV crystallization
T.A. Land, A.J. Malkin, Yu.G. Kuznetsov, A. McPherson and J.J. De Yoreo 893
Ab initio prediction of polymorphs
F.J.J. Leusen 900
Interferometric study on the crystal growth of tetragonal lysozyme crystal
K. Kurihara, S. Miyashita, G. Sazaki, T. Nakada, Y. Suzuki and H. Komatsu 904
Nucleation and growth of drop-like clusters in two-dimensional colloidal systems
X.-Y. Lei, P. Wan, Q.-H. Wei, C.-H. Zhou and N.-B. Ming 909
Michelson interferometric studies of protein and virus crystal growth
Yu.G. Kuznetsov, A.J. Malkin, A. Greenwood and A. McPherson 913
Growth of shaped single crystals of proteins
A. Moreno, D. Rondón and J.M. García-Ruiz 919
In-situ observation of the concentration gradient layer around a growing crystal of leucine complex
K. Hasegawa, S. Miyashita, H. Komatsu, C. Sano and N. Nagashima 925
J-aggregates of cyanine dye molecules adsorbed on AgBr emulsion crystal surfaces
H. Saijo and M. Shiojiri 930
Epitaxial growth of indigoid dyes on oriented polyethylene films
K. Tanabe and M. Shiojiri 935
Direct analysis of an organic molecular beam by quadrupole mass spectrometry
K. Yase, Y. Yoshida, T. Uno and N. Okui 942
Two-dimensional crystallization of ferritin molecules at the air–water interface
K. Yase and T. Udaka 946

IV.3. Minerals

Topology and crystal growth of natural chrysotile and polygonal serpentine
A. Baronnet and B. Devouard 952

IV.4. Nano / microcrystals

Hydrothermal synthesis of $BaTiO_3$ nano/microcrystals
C.-T. Xia, E.-W. Shi, W.-Z. Zhong and J.-K. Guo 961

SECTION V. MASS CRYSTALLIZATION

V.1. Crystallization from fluids

Spectroscopic monitoring of environmentally benign anti-solvent crystallization
M. Uusi-Penttilä and K.A. Berglund 967
Emulsion solidification of meta-chloronitrobenzene: purification and crystallisation
R.J. Davey, J. Garside, A.M. Hilton, D. McEwan and J.W. Morrison 971
Separation of *o*- and *p*-chlorobenzoic acids: hydrotropy and precipitation
E.J. Colônia, A.B. Dixit and N.S. Tavare 976
Thermodynamic studies of levitated microdroplets of highly supersaturated electrolyte solutions
A.S. Myerson, A.F. Izmailov and H.-S. Na 981
Precipitation of ultrafine benzoic acid by expansion of a supercritical carbon dioxide solution through a porous plate nozzle
C. Domingo, E.M. Berends and G.M. van Rosmalen 989
Crystal growth in silicagels in the temperature range 100°C to 250°C
W.A. Franke 996

V.2. Precipitation

The role of hydrodynamics in precipitation
T. Manth, D. Mignon and H. Offermann 998
Three-zone approach for precipitation of barium sulphate
M.L.J. van Leeuwen, O.S.L. Bruinsma and G.M. van Rosmalen 1004
A laboratory continuous crystallization system for aluminium hydroxide precipitation studies
V.A. Chan and H.M. Ang 1009
Calcium carbonate precipitation from aqueous solutions containing Aerosol OT
A. López-Macipe, J. Gómez-Morales and R. Rodríguez-Clemente 1015
Precipitation of calcium carbonate from solutions with varying Ca^{2+}/carbonate ratios
J. Gómez-Morales, J. Torrent-Burgués, A. López-Macipe and R. Rodríguez-Clemente 1020
Influence of mixing on the particle size distribution of an organic precipitate
L. Marmo, L. Manna, F. Chiampo, S. Sicardi and G. Bersano 1027

V.3. Melt crystallization

Purification of organic solid solutions by melt crystallization: comparison between layer and suspension crystallization
M. Matsuoka, T. Fukuda, Y. Takagi and H. Takiyama 1035
Suspension crystallization of p-dichlorobenzene from the melt
C.Y. Tai, C.-Y. Shih and W.-S. Juang 1040

V.4. Collective behavior of crystals

Crystallization kinetics of pentaerythritol
R. Ó Meadhra, H.J.M. Kramer and G.M. van Rosmalen 1046
Interpretation of dissolution rates by the reaction fractal dimensions
M. Momonaga, J. Stávek and J. Ulrich 1053
The effect of impact energy and the shape of crystals on their attrition rate
C. Gahn, J. Krey and A. Mersmann 1058
Characterization of mixing of suspension in a mechanically stirred precipitation system
B. Farkas, T. Blickle, Zs. Ulbert and M. Hasznos-Nezdei 1064
A comparison of secondary nuclei produced by contact of different growth faces of potash alum crystals under supersaturated solutions
M.M. Reyhani and G.M. Parkinson 1068

V.5. Product and process control

The dispersion of growth rate as a result of different crystal perfection
U. Tanneberger, R. Lacmann, A. Herden, H. Klapper, D. Schmiemann, R.A. Becker, A. Mersmann and U. Zacher 1074
Morphology of 6-aminopenicillanic acid crystals and the effect of phenoxyacetic acid
S.M. Mwangi and J. Garside 1078
Modelling of industrial crystallizers, a compartmental approach using a dynamic flow-sheeting tool
H.J.M. Kramer, J.W. Dijkstra, A.M. Neumann, R. Ó Meadhra and G.M. van Rosmalen 1084
Changes in copper sulfate crystal habit during cooling crystallization
M. Giulietti, M.M. Seckler, S. Derenzo and J.V. Valarelli 1089
Crystallization of tetracosane from dodecane solutions with homologous additives
B.D. Chen and J. Garside 1094
Influence of admixtures and operating conditions on the crystallization of ammonium chloride
A. Chianese, N. Santilli and O. Söhnel 1099
Crystallization kinetics of potassium sulfate in an MSMPR stirred crystallizer
Z.L. Sha, H. Hatakka, M. Louhi-Kultanen and S. Palosaari 1105

V.6. Electrocrystallization

Electrochemical nucleation induced by nonequilibrium fluctuations
A. Tadano, M. Asanuma and R. Aogaki 1111
Morphology and growth mechanism of ZnO particles electro-crystallized on Zn in aqueous solution
M. Kitano, T. Okabe and M. Shiojiri 1116

Report on the meetings of the IOCG Executive Committee, Council and General Assembly held during ICCG-11 in The Hague, The Netherlands, 18–23 June 1995 1121

Author index 1125

Subject index 1137